

REMARKS

By the above amendment, claim 23 has been amended to correct an informality therein introduced in the Amendment of October 3, 2002 in that the symbol " \div " was inadvertently change to a " \pm ". By the present amendment, the formula has been clarified to recite "a square root obtained by a formula of unit distance/dot density". Additionally, claim 26 has been canceled and new claims 32 - 37 have been presented wherein claim 32 is an independent claim reciting features similar to that recited in previous independent claims 1 - 3 while further reciting the features of a diffusion plate and at least one light condensing plate arranged between the light conductor plate and the liquid crystal cell which features further distinguish over the cited art, as will be discussed below.

As to the rejection of claims 1 - 3 under 35 USC 103(a) as being unpatentable over Ciupke et al (US 5,461,547); and the rejection of claims 6 - 12, 16, 17, 18 - 26, 27 and 15 under 35 USC 103(a) as being unpatentable over Ciupke et al, such rejections are traversed insofar as they are applicable to the present claims and reconsideration and withdrawal of the rejections are respectfully requested.

As noted in the prior amendments, the requirements for supporting a rejection under 35 USC 103 are generally set forth in the decision of The Examiner is referred to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), and In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002). Applicants note that the present invention is directed to improving the brightness and uniformity of lighting a liquid crystal cell of a liquid crystal display apparatus, which prior attempts at lighting having proven unsatisfactory with conventional v-shaped grooves of the type as disclosed in the cited patent to Ciupke et

al. More particularly, in accordance with the present invention, rather than elongated v-shaped grooves which extend over the entire width and/or length of a light conductor plate, the present invention utilizes individual discrete dots wherein the plural dots are arranged in both the length and width direction of a light conductor plate as illustrated in Figure 1 of the drawings of this application, for example. More particular, as described at page 20 of the specification, the size or area of the dot is determinative of the visibility of the dot as well as in terms of efficiency of reflection and obtaining of a desired brightness. More particularly, as described at page 20 of the specification, when the size of the dot is such that the dot is visible in the sum characters or patterns, in the case that the user for the personal computer or like sees the liquid crystal display apparatus, a judgment of the characters and the patterns is sometimes prevented. Additionally, the size or area of the dot effects the efficiency of reflection and desired brightness and as described, the area of the dot is desirably greater than 0.001 square mm up to about 0.01 square mm as recited in independent claims 1 - 3 of this application, as well as new independent claim 32. Furthermore, applicants have determined that to improve the brightness of light extracted from the light conductor plate, it is effective to provide a diffusion plate and a plurality of light condensing plates as optical members to be arranged in the light path between the light conductor plate and the liquid crystal cell as described at pages 23 - 33 of the specification and that the optimum angle of inclination of the dots in such an arrangement is within the range of 7 to 43° as also recited in independent claims 1 - 3, it being noted that such features are also recited in new independent claim 32. Applicants submit that these recited features cannot be ignored and are not disclosed or taught in the cited art as will become clear

from the following discussion.

In setting forth the rejection based upon Ciupke et al, the Examiner indicates that Ciupke et al discloses the lighting system comprising an edge lit type light guide with a plurality of parallel microgrooves. As clearly illustrated in Figure 1 of Ciupke et al, each of the microgrooves 17 extends the entire width of the light guide pipe 11 which appears to be at least equal to the width of the liquid crystal display 12, and possible exceeds the same. The Examiner contends that Ciupke et al teaches that the v-shaped grooves 17 typically have depths of 2.5 to 10 micron and have an angle of 45 to 55 ° with respect to a direction perpendicular to the light guide and contends that "given the angle of inclination, it would have been obvious to one of ordinary skill in the art that the width of the microgrooves would typically be greater by a factor of 2 to 3. The width would then be in the range of 7.5 to 30 microns. A width in this range and a length several times larger than the width would yield an area within the range of 0.01 to 0.001 square mm." The Examiner then contends that "furthermore, the area range encompasses several orders of magnitude and the angle range encompasses almost the entire useful range. These parameters were well known to be result effective variables which those of ordinary skill in the art knew to adjust in order to control the brightness and light distribution of the lighting system." (Emphasis added). Applicants submit that the Examiner's conclusions and suggestion concerning the area have no basis in the disclosure of Ciupke et al and is mere speculation on the part of the Examiner. Applicants submit that the position by the Examiner represents a position of "inherency" based upon the disclosure of Ciupke et al and the Examiner is referred to the decision of In re Robertson, 49 USPQ 2d 1949 (Fed. Cir. 1999), wherein the court pointed out

that, if the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if the element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." (Emphasis added). Moreover, the court pointed out that inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

At the outset, applicants submit that a plurality of v-shaped microgrooves 17 which extend the entire width of the light guide 11 in Ciupke et al do not represent a "plurality of dots" wherein "each of said dots having an area within a range of 0.01 to 0.001 square mm and an angle of inclination of a cross-section thereof is within a range of 7 to 43°" as recited in the independent claims of this application. That is, the dots represent discrete portions of the light conductor plate and the microgrooves of Ciupke et al do not represent a plurality of dots nor does each of the microgroove delimit an area with a cross sectional angle of inclination as defined. Applicants submit that the Examiner has engaged in a hindsight reconstruction attempt utilizing the principle of "obvious to try" which is not the standard of 35 USC 103. See In re Fine, supra, and that the Examiner's position that it would be obvious to provide the claimed features since such is common knowledge has been rejected by the Court. See, In re Lee, supra. Thus, applicants submit that irrespective of the Examiner's contentions, Ciupke et al does not disclose or teach a plurality of dots, which contrary to the position set forth by the Examiner is not obtained by a plurality of parallel microgrooves, wherein

each of the dots has a size determined by the area recited in independent claims 1 - 3 and 32 and with an inclination angle and cross section as recited in independent claims 1 - 3 and 32. As such, applicants submit that independent claims 1 - 3 and 32 and therewith the dependent claims patentably distinguish over Ciupke et al in the sense of 35 USC 103 and such claims should be considered allowable thereover.

With respect to newly presented independent claim 32, as noted above, such claim recites the features of a plurality of dots having the area and inclination angle as recited in claims 1 - 3 and additionally recites the feature of a diffusion plate and at least one light conducting plate arranged between the light conductor plate and the liquid crystal cell so as to enable lighting of the liquid crystal cell from the light emitting side of the light conductor plate. In Ciupke et al, applicants note that while this patent discloses a diffuser or brightness enhancing film 31 between the light conducting pipe 11 and the liquid crystal display 12, such patent does not disclose or teach at least one light condensing plate in addition to a diffusion film which is not a plate. Thus, applicants submit that claim 32 further patentably distinguishes over Ciupke et al in the sense of 35 USC 103.

Additionally, applicants note that the dependent claims which depend from claim 32 recite further features of the present invention. For example, claim 36 recites the feature that each of the dots has both a dimension in a length direction of the light conductor plate and a dimension in a width direction of the light conductor plate which is substantially smaller than an entire length dimension in the length direction of the light conductor plate and an entire width dimension in the width direction of the light conductor plate, respectively. As is apparent from Ciupke et al, the v-shaped

microgrooves 17 have a width dimension which extends over the entire width dimension of the light guide 11, such that claim 36 further patentably distinguishes from Ciupke et al in the sense of 35 USC 103 also with respect to such features. Additionally, claim 37 depends from claim 32 and recites the feature that the plurality of dots are arranged in both a length dimension and a width dimension of the light conductor plate. As noted above, not only does Ciupke et al fail to disclose a plurality of dots, but this patent discloses that a single v-shaped groove extends over an entire width dimension of the light conductor plate such that a plurality of grooves are not arranged in the width direction of the light guide as recited in claim 37. Thus, it is apparent that these claims further patentably distinguish over Ciupke et al in the sense of 35 USC 103, it being noted that claim 35 recites the feature that a plurality of light condensing plates are provided in addition to the diffusion plate which, features are again not disclosed or taught by Ciupke et al.

With regard to the features of other claims dependent from claim 1, for example, applicants note that in addition to Ciupke et al failing to disclose or teach a plurality of dots, as recited in the independent claims, claim 15 recites the feature that the number per unit area of the small projecting portions or the small recess portions which constitute the dots is increased from a side of the light source toward an opposite side with other dependent claims reciting structural features not disclosed or taught by Ciupke et al. For example, claim 23 defines an average distance between the dots, claims 24 and 25 recite the feature of a calculated average surface roughness Ra of portions other than a dot forming surface and claim 27 recites the feature of a thickness of the light conductor plate is different in accordance with the distance from the light

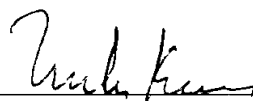
source, none of which features are disclosed or taught by Ciupke et al and which features cannot be ignored as being well known or obvious to one of ordinary skill in the art. See In re Lee, supra. As such, applicants submit that the dependent claims recite further features not disclosed or taught by Ciupke et al, when considered in conjunction with the parent claim, and that these claims further patentably distinguish over Ciupke et al in the sense of 35 USC 103 and should be considered allowable thereover.

In view of the above amendments and remarks, applicants submit that all claims present in this application should now be in condition for allowance and issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 500.38128X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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TANIGUCHI et al
US Serial No. 09/463,776

VERSION WITH MARKINGS TO SHOW CHANGES

IN THE CLAIMS:

23. (Twice amended) A liquid crystal display apparatus as claimed in claim 1, wherein an average distance between the dots constituted by the small projecting portions or the small recess portions in said light conductor plate, that is, a square root of a result obtained by a formula of unit distance ~~\pm~~ dot density is changed from a portion near the light source toward a portion apart from the light source, and the distance is substantially great in the portion near the light source.